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Claims

1. A fluid phase distribution adjuster comprising two or more tubes arranged to provide a plurality of separate flow paths for fluid, and means for generating a radial acceleration of fluid flowing through each tube so as to promote movement of at least one fluid phase towards or away from a wall of the tube.
2. A coalescer for increasing droplet size of a distributed phase fluid carried by a continuous phase fluid of a process flow stream in a pipeline, the coalescer comprising:
 - a pipe for installation in the pipeline;
 - a plurality of tubes arranged within the pipe so as to divide the process flow stream into a plurality of separate flow paths through corresponding tubes; and
 - means for imparting a radial acceleration to the fluid flowing through each tube so as to promote coalescence of droplets as a result of movement of the droplets towards or away from a wall of the tube.
3. A coalescer according to claim 2, configured to promote coalescence of a distributed phase comprising liquid droplets in a continuous phase comprising another liquid or a gas.
4. A coalescer according to claim 2 or claim 3, wherein the means for generating a radial acceleration comprises one or more longitudinal vanes extending partially or completely across the tube and twisted to form a helix

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along the axis of the tube so as to impart a rotational motion to fluid passing through the tube.

5. A coalescer according to claim 2 or claim 3, wherein each tube is of non-circular cross-section and is helically twisted about the longitudinal axis so that the walls of the tube impart a rotational motion to fluid passing through the tube.

6. A fluid phase distribution adjuster according to claim 1 or a coalescer according to any one of claims 2 to 5, wherein the means for generating radial acceleration includes means for generating turbulence in the continuous phase.

7. A mixer for mixing a first fluid as droplets of a distributed phase within a continuous phase fluid of a process flow stream in a pipeline, the mixer comprising:

a pipe for installation in the pipeline;
a plurality of tubes arranged within the pipe so as to divide the process flow stream into a plurality of separate flow paths through corresponding tubes;

inlet means for introducing the first fluid phase as droplets into each tube; and

means for imparting a radial acceleration to the fluid flowing through each tube so as to distribute the droplets in the process flow stream.

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8. A fluid phase distribution adjuster according to claim 1, or a coalescer according to any one of claims 2 to 6, or a mixer according to claim 7, wherein the number, length and diameter of the tubes, as well as the means for generating radial acceleration are selected to provide fluid velocities and turbulence intensities so that desired effects of droplet coalescence or mixing are produced for a given fluid mixture composition, physical properties and flow rate.
9. A fluid phase distribution adjuster according to claim 1, or a coalescer according to any one of claims 2 to 6, or a mixer according to claim 7, wherein the tubes have an area averaged hydraulic diameter, D_h^* of 10 to 100 mm.
10. A fluid phase distribution adjuster according to claim 1, or a coalescer according to any one of claims 2 to 6, or a mixer according to claim 7, wherein the ratio L_f^*/D_h^* (the area averaged flow length path L_f^* to the area averaged hydraulic diameter D_h^*) is 50 to 200 and more preferably has a design value of about 110 for water continuous flow, whereas L_f^*/D_h^* is 10 to 100 and more preferably has a design value of about 30 for oil continuous flow.
11. A process for coalescing droplets of a distributed phase fluid carried by a continuous phase fluid of a process flow stream, the process comprising:
 - causing the process flow stream to flow into a coalescer unit comprising a plurality of tubes;
 - dividing the process flow stream into a plurality of separate flow paths through corresponding tubes; and

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imparting a radial acceleration to the fluid flowing through each tube so as to promote coalescence of droplets as a result of movement of the droplets towards or away from a wall of the tube.

12. A process for mixing a first fluid as droplets of a distributed phase within a continuous phase fluid of a process flow stream, the process comprising:

causing the process flow stream to flow into a mixer unit comprising a plurality of tubes;

dividing the process flow stream into a plurality of separate flow paths through corresponding tubes;

introducing the first fluid phase as droplets into each tube; and

imparting a radial acceleration to the fluid flowing through each tube so as to distribute the droplets in the process flow stream.